PROJECT 8A

Stony Creek Fan Conjunctive Water Management Program

1. Project Description

Project Type:	**Conjunctive water management**
Location:	**Colusa Basin, northern Glenn County**
Proponent:	**Orland-Artois Water District (OAWD), Orland Unit Water Users' Association (OUWUA), and Glenn-Colusa Irrigation District (GCID)**
Project Beneficiaries:	**OAWD, OUWUA, GCID, in- and out-of-basin users, environment, Delta**
Long-term Components:	**Short-term components, development of regional conjunctive water management program consisting of a direct and in-lieu recharge component, a groundwater production component, a dedicated monitoring well network component, and supporting elements including development of an integrated groundwater-surface water model and outreach program**
Potential Supply:	**Currently being evaluated as part of ongoing Phase 1 feasibility study (possibly range from 50,000 acre-feet per year [ac-ft/yr] to 100,000 ac-ft/yr)**
Cost:	**$245 million (Preliminary; refine during ongoing Phase 1 work)**
Current Funding:	**$530,000**
Short-term Components:	**Development of a pilot scale project consisting of direct and in lieu recharge components, a groundwater production component (through agreements with private well owners), a groundwater monitoring program, integrated groundwater-surface water modeling, and an outreach program**
Potential Supply (by 2003)	**Potential minimal supply as part of pilot scale project; this supply might be available during the 2002/2003 water year**
Cost:	**$2.1 to $2.5 million**
Current Funding:	**$530,000 (California Department of Water Resources [DWR] Integrated Storage Investigation [ISI])**

Implementation Challenges:	**Environmental issues; strong coordination among local, state, and federal agencies and specific regional-scale projects; water rights issues**
Key Agencies:	**OAWD, OUWUA, GCID, Glenn County, local landowners, DWR, U.S. Bureau of Reclamation (USBR), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), environmental interest groups, California Department of Fish and Game (CDFG), State Water Resources Control Board**

Summary

The basic premise of the proposed Program is to conjunctively manage surface water and groundwater to change the timing of available supplies. This is accomplished by supplying the Program with surface water for storage or replenishment, typically in above normal and wet year-type conditions, and then recovering a portion of this water during periods of water supply shortage. This type of integrated resources management has the potential to improve operational flexibility on a regional basis resulting in measurable benefits locally in the form of predictable, sustainable supplies, and improved reliability for water users' elsewhere in the state.

A program such as this has many facets. The core elements are the physical opportunities that exist to develop a storage and recovery program, the operational criteria governing how and when storage and recovery occurs, and the economic feasibility of the program.

Physical Characteristics

The physical characteristics of the study area (see Figure 8A-1) are well suited for the proposed conjunctive water management program. The northern Glenn County aquifer has adequate groundwater storage and production capacity. The Stony Creek Fan is a highly permeable and transmissive formation capable of accepting natural and artificial recharge at relatively rapid rates. Existing surface water distribution and extraction facilities are well positioned to support in lieu recharge operations. A strategic alliance has been formed by the Program sponsors bringing these key elements together to help make the Program possible.

Direct recharge could take place primarily over permeable portions of the Stony Creek Fan that exists in portions of OUWUA, OAWD, and to a lesser extent in GCID. In lieu recharge could occur in a majority of the OAWD area, where agricultural lands can be irrigated with a combination of surface water and groundwater pumped by privately owned wells. In lieu opportunities are not readily available to OUWUA lands because of the existing dominant use of surface water and lack of agricultural production wells. Expanded in lieu recharge in OAWD and OUWUA could be accomplished with the development of new extraction facilities in areas currently served only by surface water. The proposed investigation would consider the cost of developing a range of direct recharge as well as in lieu recharge opportunities.

Initial Program concepts have considered a variety of surface water sources that could be supplied for storage, primarily by Program sponsors. These sources include: 3F Central

Valley Project (CVP) water; unappropriated waters of the Sacramento River Basin; GCID Base Supply; Stony Creek water; unused Tehama-Colusa CVP contract water; and new supplies generated by potential new surface storage facilities. Surface water could be conveyed via OUWUA facilities or the Tehama-Colusa Canal and delivered either to irrigators or to recharge facilities through existing distribution facilities. Characterization of each of these potential sources is a key requirement for project refinement. The point of diversion and timing, rate and duration of availability of each source would determine how it could be conveyed and whether direct or in lieu recharge would be required

The prevailing direction of existing regional groundwater flow through the study area is generally from northwest to southeast, meaning that any water recharged by the Program would probably migrate over time. Consequently, recovery would be located down-gradient of recharge locations. One option would be for recovery of stored water to be performed by down-gradient pumpers located in GCID. In that case a cooperative pumping program agreement would be required between GCID and these private landowners to coordinate pumping operations. Stored water could also be recovered by landowners located in OAWD, also requiring agreements between OAWD and the relevant landowners.

The geology of the Stony Creek Fan is not well known, and a major objective is to characterize the factors that influence groundwater flow through the study area. Opportunities to influence groundwater flow by strategic pumping, thereby slowing or eliminating groundwater migration, would also be examined. The outcome of these investigations would guide formulation of recharge and recovery strategies.

Operational Considerations

Water placed into storage is commonly referred to as "Put" water. Water retrieved from storage is commonly referred to as "Take" water. Regardless of the supply source, Put and Take cycles would govern the operation of the conjunctive water management project. The relationship between these Put and Take cycles would be based on the agreed upon terms and conditions. Terms and conditions would be based on a combination of factors including indexes describing anticipated water supply availability, formulas describing the fraction of stored water that can be recovered, Glenn County BMOs (for groundwater levels, groundwater quality, and land subsidence), and other technical, economic, and institutional considerations.

Economic Feasibility

The yield of the Program has not yet been analyzed, but initial indications are that the Program could augment existing local water supplies as well as improve water supply reliability regionally. The key factors that could limit the Program are likely to be recharge and extraction capacity. The proposed investigation would evaluate a range of possible recharge and extraction scenarios to determine the most cost-effective means of providing yield under water-short conditions. This analysis would require an understanding of the overall water balance of the study area, water needs of the Program sponsors, an assessment of direct and in lieu recharge opportunities and associated costs, an assessment of extraction facilities and costs, proposed operational criteria, and an assessment of potential

environmental and third-party impacts. These analyses would be conducted as part of initial feasibility studies described further below.

Short-term Component

The short term components of this project consist of feasibility studies, followed by one or more small-scale pilot projects based on the study findings. Environmental study work would then follow or begin in parallel with the pilot projects. The feasibility study to investigate the conjunctive water management program would cost approximately $730,000, and is underway. Funding has been made available as part of a cost-share arrangement between DWR ISI and OAWD (lead agency) in partnership with OUWUA and GCID. There are several efforts that are underway in conjunction with the feasibility study including the development of the groundwater production element, a groundwater monitoring program improvement element, an integrated groundwater-surface water model, and an outreach plan. Technical and policy oversight groups representing the program proponents are providing overall direction of these efforts. Coordination and integration of these elements is critical to the success of this overall program. The combined costs of these efforts in conjunction with the overall feasibility study is estimated to be between $2,100,000 and $2,500,000.

Small-scale pilot test projects would be conducted as part of the feasibility studies. Depending on location and local conditions, these pilot test projects could potentially generate a small quantity of water supply by 2003. Larger-scale pilot projects, or demonstration projects, are planned for subsequent phases of the work following completion of the feasibility studies. The costs for the larger-scale demonstration projects depends on the findings of the feasibility studies.

Long-term Component

The primary purpose of this evaluation is to evaluate the potential for this project to provide water supply benefits in the short-term (by end of 2003). As part of this initial evaluation, potential long-term components of the proposed project (defined as any part of the project proceeding past or initiated after December 2003) have been considered on a conceptual level. Further consideration and technical evaluation of long-term component feasibility and cost will occur as the next level of review under the Sacramento Valley Water Management Agreement. Long-term-component project descriptions are included in these short-term project evaluations only as a guide to the reader to convey overall project intent.

The project area is located in northern Colusa Sub-basin within Glenn County and overlies the Stony Creek Fan alluvium as well as other areas served by the project proponents. The combination of groundwater resources, favorable recharge conditions, and the surface water supply and distribution facilities provides a strong potential for a conjunctive water management program to utilize the surface and groundwater resources for maximum local and regional water supply benefits. The conjunctive management concepts presented here should be considered in the context of other conjunctive management proposals such as Projects 5B, 5E, and 9A, each of which are considering development of a common groundwater resource within the Stony Creek Fan aquifer. Ideally, these various projects would be evaluated and developed in a coordinated manner under this CALFED ISI-sponsored investigation

The conceptual outline for conjunctive water management under this project is as follows. Local groundwater pumping would be done on a seasonal basis for two basic beneficial purposes. First, local groundwater pumping in the project proponents service areas could allow reduced diversions of their respective surface water supply, allowing an equivalent quantity of water to be held in storage in upper reservoirs and released for other targeted beneficial uses. These beneficial uses could include a mix of other local irrigation needs, in-stream flow or other environmental uses, or transfer to third parties under appropriate arrangements. Secondly, local groundwater pumping by users within the project area could help cover the supply deficit caused by Central Valley Project Improvement Act (CVPIA)-instituted supply cutbacks as well as seasonal restrictions on the operation of Red Bluff Diversion Dam (RBDD).

Recharge of the groundwater basin would occur from a mix of in lieu recharge (natural recharge with reduced groundwater pumping in wet years) and direct recharge from infiltration basins supplied with surface water using a combination of the regional surface water distribution facilities.

The potential yield from the conjunctive water management program, in terms of dry-year yield only or average annual yield, is unknown. However, previous investigations of the Stony Creek Fan groundwater basin provide a range of potential development levels for further evaluation. The ongoing feasibility investigation would firm up the groundwater development potential for this area over the next year.

The following primary types of facilities may be required for the conjunctive water management portion of this project:

- **Recharge basins—**Recharge basins may be used to accelerate the recharge of water into the groundwater basin using available excess surface water supplies in wet or normal years. The recharge basins would be located to provide "inflow" to the basin near its upgradient area, indicated by the groundwater flow and hydrogeology of the basin. The total acreage of basins required would depend on the targeted annual recharge quantity and the rate of infiltration from the basins to the underlying aquifer. Existing gravel mining sites along Stony Creek may provide suitable areas for such basins. An assumed conceptual-level sizing of the basins was done using the following parameters (general soils characteristics of the area with an assumed average infiltration rate of 0.5-foot per day): 120 days of recharge operation during wet years, approximately 50,000 ac-ft of targeted recharge, use of approximately 200 acres of reclaimed existing gravel mining basins adjacent to Stony Creek, and 600 acres of new recharge basins. The recharge basins could potentially serve a second purpose as off-canal storage facilities or drainage recapture/storage facilities.

- **Extraction wells—**The number, size, capacity, and location of the extraction wells would be determined by feasibility-level investigations, groundwater modeling, monitoring, and other critical factors. Operating agreements between project parties and private landowners would be developed to enable management of groundwater production, both in terms of when and where extractions occur or do not occur. Using an assumed average well capacity of approximately 3,000 gallons per minute (gpm) and a seasonal pumping window of approximately 3 months, the required number of new wells for pumping up to 50,000 ac-ft/yr is between 40 and 50 wells. It is assumed that a number

of existing suitable wells could be utilized under operating agreements with private well owners potentially distributed throughout the project proponent service areas.

- **Monitoring wells—**A network of monitoring wells would be required to track groundwater levels and provide critical information to ensure groundwater management objectives are being met. The monitoring well data would help track key objectives such as total recharge and extraction volumes, hydraulic gradients and flow directions for the groundwater, and impacts to other parties.
- **Distribution pipelines—**The extraction wells may discharge directly into canals or open-channel laterals in some cases, but in others it may be necessary to convey the groundwater from the wells to distribution facilities. The size and length of these pipelines would depend on the actual flow rates from wells and the well location relative to existing or future distribution systems.

2. Project Benefits/Beneficiaries

Water Supply Benefits

The place and type of use for the project yield would depend on the following factors: the actual hydrologic conditions for each year (wet, normal, dry), the final configuration of the project facilities, project participants, operating agreements, and targeted benefits. The types of targeted water supply beneficiaries are assumed to include the following:

- **The project proponents: OAWD, OUWUA, and GCID, and other local water users—**The proposed project would assist in meeting local irrigation supply requirements. In normal and wet years this supply may come primarily from surface water sources, with some groundwater use as required in drier years.
- **Stony Creek and Sacramento River—**In-stream flows and other environmental benefits in support of long-term Stony Creek and Sacramento River management objectives could potentially be met with this regional project. This increased supply to in-stream flows would come from a combination of flexibility on the use of RBDD to reduce early spring diversions, seasonal use of groundwater to minimize the need for surface water supplies, and increased efficiency within the irrigation districts.
- **Sacramento-San Joaquin Delta and other Sacramento Basin users**—Other Sacramento Basin water supply needs, including increased net seasonal inflows to the Sacramento-San Joaquin Delta, could be met with the proposed project. This supply would likely come primarily from dry-year use of groundwater in the project area, with reduced surface water diversions providing net increases in in-stream flows to the Delta.

Water Management Benefits

This project may potentially provide water management benefits primarily by increasing conveyance and on-farm efficiency, providing flexibility in the timing of surface water diversions on both the Sacramento River and Stony Creek, increasing the ability to store and target releases of surface water supplies, and providing increased flexibility and reliability through management of both surface- and groundwater supplies. The operational basis for these potential management benefits is described under Section 1. The conjunctive water

management of the groundwater and surface water supplies may also help to minimize impacts from increased groundwater pumping such as subsidence and long-term changes in groundwater levels.

Water Quality Benefits

The water quality benefits of the project are anticipated to derive largely from the increased seasonal in-stream flows, which generally would be expected to improve both temperature and constituent quality parameters. These benefits would need to be evaluated and modeled on a regional basis to determine both the qualitative and quantitative impacts on water quality in Stony Creek, the Sacramento River, and the Delta.

3. Project Costs

The cost opinions shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation from the information available at the time of the estimate. It is normally expected that cost opinions of this type, an order-of-magnitude cost opinion, would be accurate within +50 to –30 percent. Project costs were developed at a conceptual level only, using data such as cost curves and comparisons with bid tabs and vendor quotes for similar projects. The costs were not based on detailed engineering design, site investigations, and other supporting information that would be required during subsequent evaluation efforts.

The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the final project costs will vary from the opinions presented here. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Conceptual-level Capital Costs

Future phases of the feasibility study would include detailed cost estimates for new facilities. At this time, an extremely rough cost opinion for the long-term project can be made for general comparative purposes only. Each major project component can be considered somewhat independently from a cost perspective, so that the actual cost of the implemented project could vary widely depending on the scope and layout of the facilities actually constructed. Tables 8A-1 and 8A-2 present general cost information for each component.

TABLE 8A-1
Planning-level Capital Costs for Distribution System Improvements/Expansions
Stony Creek Fan Conjunctive Water Management Program

Item	Quantity	Units	Unit Price ($)	Total Capital Cost ($ million)	Assumptions
OUWUA Distribution System	6,500	Acres	3,600	23.4	Piped distribution system for approximately one-third of the 20,000 acre service area.
OAWD Distribution System	15,000	Acres	3,600	54.0	Piped distribution system for expanded service area increasing service area 50 percent to include lands not in district.
GCID Distribution System	15,000	Acres	3,600	54.0	Piped distribution system for expanded service area to potentially include lands not in district (assumed same expansion amount as OAWD)
			Subtotal	**131.4**	
			Contingencies and Allowances (30%)	39.4	
			Total Construction Costs	170.8	
			Engineering, Environmental, Construction Management and Admin. (25%)	42.7	
			Total Cost	**$213.5**	

TABLE 8A-2
Planning-level Capital Costs for Conjunctive Management Facilities
Stony Creek Fan Conjunctive Water Management Program

Item	Quantity	Units	Unit Price ($)	Total Capital Cost ($ million)	Assumptions
Extraction Wells (possible in all three districts)	35	Each	200,000	7.0	35 wells, 500 ft deep, 16-inch dia., 2,500 gpm. 50,000 ac-ft/yr dry-year pumping, mix of new and existing wells, 50 wells total.
Monitoring Wells (single-completion)	25	Each	19,500	0.5	Estimated Well Construction Cost (Single Completion Monitoring Well 200' deep)
Monitoring Wells (multi-completion)	25	Each	96,000	2.4	Estimated Well Construction Cost Multi-completion Monitoring Well 1000' deep)
Recharge Basins (in a three districts)	1,940,000	Cubic yards	5	9.7	600 acres of new basins
			Subtotal	**19.6**	
			Contingencies and Allowances (30%)	5.9	
			Total Construction Costs	25.5	
			Engineering, Environmental, Construction Management and Admin. (25%)	6.4	
			Total Cost	**$31.8**	

Initial Funding Requirements and Sources

Early phases of the project work consist of completing a feasibility study, conceptual design, in preparation for potential implementation of pilot project(s). This work is being supported by a cost-sharing agreement between the project proponents and the ISI Conjunctive Water Management Branch. OAWD, in partnership with OUWUA and GCID, has received funds of $530,000 from the ISI to complete the feasibility investigations. In addition, additional funding is being provided for the groundwater production element, the monitoring improvement program element, the integrated groundwater-surface water modeling, and the outreach plan.

4. Environmental Issues

As noted in Section 2, this project is anticipated to provide benefits in the form of increased water supply, more flexible water management, and improved water quality – all of which could improve the greater Sacramento River ecosystem.

Project implementation would also result in impacts to the environment, notably through the artificial manipulation of groundwater levels. In some areas of the state, these types of projects have resulted in public concern and controversy, which tends to heighten scrutiny of the environmental effects of such projects. Efforts to address these concerns are noted in Section 5, Implementation Challenges. Construction-related impacts would also occur prior to project implementation. Construction-related impacts would be similar to other, common construction projects that occur near seasonal drainages and waterways. It is likely that the appropriate level of environmental documentation necessary for this project would be an environmental impact statement/environmental impact report (EIS/EIR).

Implementation of the project would also require issuance of permits from various regulatory agencies. Following is a summary of the likely permitting requirements. Additional permitting requirements may be identified pending further project refinement.

- **State Water Resources Control Board—**Applications for new water rights and changes in point of diversion would be required.
- **Regional Water Quality Control Board—**Large amounts of earthwork would be required for the recharge basins. Depending upon project configuration and location, Water Quality Certification under the federal Clean Water Act may be required for construction.
- **Federal and State Endangered Species Act—**Consultation with state and federal resource agencies (e.g., USFWS, NMFS, CDFG) may be required to protect special-status species and their habitat.
- **U.S. Army Corps of Engineers (COE)—**The project may affect wetland habitat and require a permit for discharge of dredged or fill material pursuant to Section 404 of the federal Clean Water Act.
- **State Lands Commission—**Project would need to consult with State Lands Commission on the public agency lease/encroachment permitting for use of state lands.

- **State Reclamation Board—**The project may be subject to rules regarding encroachment into existing floodways.
- **Federal Emergency Management Agency (FEMA)—**Letters of map revision need to be filed with FEMA for projects that affect Flood Insurance Rate Maps.
- **Advisory Council on Historic Preservation—**Consultation under Section 106 of the National Historic Preservation Act may be necessary if historical resources are affected by construction of the project.
- **California Department of Fish and Game—**If alterations to streams or lakes are required as part of project implementation, a Streambed or Lakebed Alteration Agreement may be required.
- **Local governments and special districts—**Specific agreements for rights-of-way, encroachments, use permits, or other arrangements may need to be made with local entities in the vicinity of the project.

A draft California Environmental Quality Act (CEQA) environmental checklist has been prepared for this proposed project and is included as an attachment to this evaluation. The checklist provides a preliminary assessment of the environmental areas of concern, as well as areas that are not likely to be of concern, associated with this project. The checklist would be finalized as part of the environmental compliance required for project implementation.

5. Implementation Challenges

The project implementation would occur in several incremental stages, each of which would have significant challenges. Many of these challenges would be inherent to any project of this size and complexity. The following lists some of the implementation challenges anticipated to be associated with this project.

Public Perception

Landowners have significant concern regarding possible groundwater overdraft. While the aquifer recharge aspects of this project may go a long way to alleviate these concerns, overdraft likely would remain a concern throughout the various stages of this project from feasibility analysis through construction and very likely continue thereafter. Monitoring and modeling of groundwater levels would not only be an essential part of this project technically, but also politically. Further, public concern accompanies any water delivery project during these water-tight times with regard to whom any project may or, just as importantly, may not benefit. As a result, many counties have passed ordinances and set numerous groundwater management objectives. To that end, the county has set strict guidelines for such water management programs as water transfers that dictate the priority of transfers taking into consideration primarily the intended recipient of the water.

Coordination among Public and Private Entities

Strong coordination would be required among local, state, and federal entities such as USFWS, USBR, and DWR. The governmental agencies would have strong interests associated directly with the project and indirectly as it may affect other interests in the area.

It is highly probable that because of the complexity and far-reaching implications of the project that competing interest may arise. Reliable communication and integrated coordination would be required to create a successful project.

Coordination between Concurrent Projects

Numerous parties are examining similar projects throughout the valley. To optimize the effectiveness of these projects, coordination between the projects would be required from the onset. The strongest motivation for such an effort is three-fold: (1) to avoid duplication of effort and as a result efficiently utilize available funds, (2) to avoid the nullification of project benefits through competing projects, and perhaps most importantly, (3) to optimize the benefits of these projects to the watershed.

Lack of Sufficient Groundwater Data

In many areas, there is limited groundwater information available, or the information that is available is unreliable.

Environmental Regulatory Compliance

Extensive environmental documentation, surveying, monitoring, and permitting would be required for this project. Habitat for known Endangered Species Act (ESA)-listed species such as the valley elderberry longhorn beetle and the giant garter snake is present within the project area. Project scheduling would have to reflect environmental regulatory requirements including any limitation on windows of construction.

Land Acquisition

It is probable that land would have to be acquired for the production wells, recharge basins, and conveyance systems. Some landowners may be resistant to the land purchases.

Recharge Basins

Siting of the recharge basins could be politically and environmentally challenging. The basin siting would have to rely heavily on groundwater modeling results, public outreach, and close coordination with environmental interest groups and government agencies (e.g., USFWS).

Key Stakeholders

The conceptual scale of the project necessarily involves a wide range of stakeholders whose interests may be impacted by the project. Table 8A-3 summarizes the key stakeholders and the range of issues that each would be expected to have interests and concerns regarding.

TABLE 8A-3
Stakeholder Roles and Issues
Stony Creek Fan Conjunctive Water Management Program

Stakeholder	Role/Concerns/Issues
OAWD, OUWUA, and GCID	• Project proponent and direct beneficiary
Glenn County	• Groundwater management objectives, compliance with County's Groundwater Management Ordinance (#1115)
Tehama County Water Interests	• Neighboring county to north; concerns with impacts to groundwater
Local Landowners	• Groundwater level changes • Project facility construction and long-term impacts
USBR, DWR	• Orland Unit and TCCA facility operations, water rights • Integration with other regional management concepts such as off-stream storage
Environmental Interest Groups	• In-stream flow impacts, fishery impacts, land use

6. Implementation Plan

The following major steps would be required to implement the project. Each step depends on successful completion of the previous supporting steps, and findings that support further actions. Figure 8A-2 shows an assumed implementation schedule based on typical time requirements for each step in a project of this scale.

1.1 Feasibility studies and conceptual design—This step has already begun, and is intended to develop the specific project components, general features, operating concepts, and potential benefits. This step would determine the basic engineering and economic feasibility of the project, and would also help determine the need for other studies.

2.1 Other studies (groundwater modeling)—These supporting studies would provide more detailed evaluation of specific aspects of the project, and would include a groundwater production element, a groundwater monitoring improvement program element, an integrated groundwater-surface water model, and development of an outreach plan.

2.2 Pilot projects—The studies may support the implementation of pilot projects such as local groundwater pumping or diverting winter flows for recharge to existing basins. The pilot projects would provide critical information to support final design and confirm the viability of specific project operating objectives.

3.1 Preliminary design—The preliminary design would involve engineering design of the major facilities to a fairly detailed level including sizes, locations, footprints, and other. This information would support key implementation steps such as right-of-way acquisition, soils testing, mapping, and permitting and environmental studies.

4.1 Environmental assessment/environmental impact report (EA/EIR)—The EA/EIR would derive from the preliminary design and would confirm the potential impacts and required mitigation, if any, for the project.

5.1 Final design—Final design would proceed following the EA/EIR work, focusing on the preferred alternative. This would involve producing engineering drawings, specifications, and other final contract documents suitable to bid and construct the project facilities.

6.1 Permitting—The various permits would be obtained using the final design as the basis for permitting requirements.

7.1 Construction—Construction would potentially be phased over several years, given the size and complexity of the project.

7.2 Operation and monitoring—Long-term operations and monitoring of the project would begin following completion of construction.

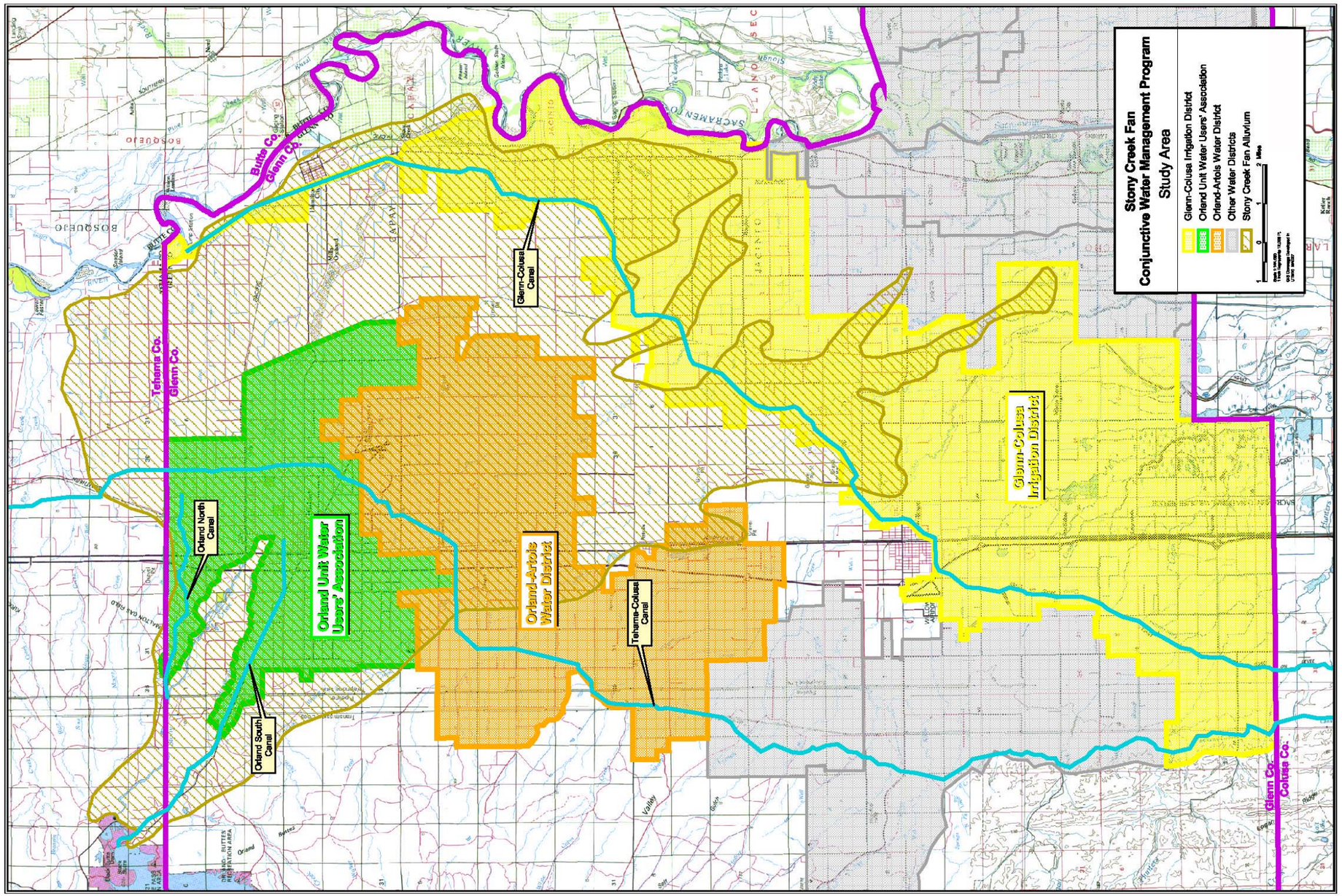

FIGURE 8A-1
PROJECT LOCATION MAP
STONY CREEK FAN CONJUNCTIVE WATER MANAGEMENT PROGRAM
SHORT-TERM PROJECT EVALUATIONS
SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI

W072001014RDD_81 (10/26/01)

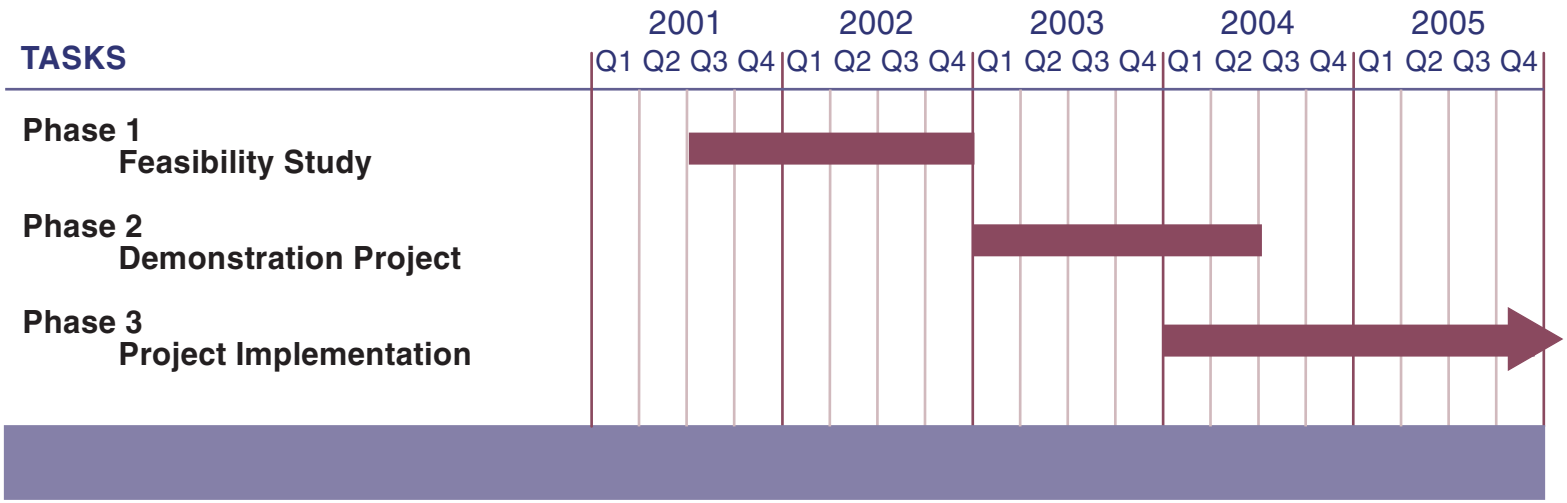

FIGURE 8A-2
PRELIMINARY IMPLEMENTATION SCHEDULE
STONY CREEK FAN CONJUNCTIVE WATER MANAGEMENT PROGRAM
SHORT-TERM PROJECT EVALUATIONS
SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI

W072001014RDD_84 (10/26/01)

Project 8A—Draft CEQA Environmental Checklist

Project 8A—Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

Determination:

(To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Printed Name For

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS—Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☒	☐	☐
Short-term impacts from increased noise and dust emissions could occur as a result of construction. Mitigation measures implemented for noise and air quality would reduce any impacts to a less than significant level.				
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
II. AGRICULTURE RESOURCES—Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☒	☐	☐	☐
Recharge basins may be used to accelerate the recharge of water into the groundwater basin, using available excess surface water supplies in wet or average water years. Approximately 200 acres of reclaimed existing gravel mining basins are adjacent to Stony Creek. The recharge basins may require a permanent conversion of potential Prime Farmland, Unique Farmland, or Farmland of Statewide Importance..				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☒	☐	☐	☐
See response to II (a) above.				
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☒	☐	☐	☐
See response to II (a) above.				
III. AIR QUALITY—Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
Increased air emissions could result from construction of the project. Implementation of best management practices (BMPs) during construction would reduce the amount of emissions, and reduce the impact to a less than significant level.				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
IV. BIOLOGICAL RESOURCES—Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? *Known Endangered Species Act (ESA)-listed species such as the valley elderberry longhorn beetle and the giant garter snake are within the area. Additionally, sensitive riparian habitat exists in and around the project site. Project scheduling would have to reflect environmental regulatory requirements including any limitation on windows of construction.*	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service? *See response to IV (a) above.*	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act, (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? *See response to IV (a) above.*	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or, impede the use of native wildlife nursery sites? *See response to IV (a) above.*	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? *The removal of some vegetation may be required for construction of the project. Mitigation measures would be implemented to replace any vegetation removed during construction, which would reduce the impact to a less than significant level.*	☐	☒	☐	☐

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?.	☐	☒	☐	☐
See response to IV (e) above.				
V. CULTURAL RESOURCES—Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐
A significant impact would occur if a cultural resource were to be disturbed by activities associated with project development. In the event that an archaeological resource was discovered, appropriate measures would be undertaken to minimize any impacts.				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
See response to V (a) above.				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
See response to V (a) above.				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐
See response to V (a) above.				
VI. GEOLOGY AND SOILS—Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
VII. HAZARDS AND HAZARDOUS MATERIALS— Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
Construction equipment would require the use of potentially hazardous materials. The potential for significant hazardous material spill would be unlikely because of the limited amount of such materials that would be used onsite. If a spill or release of such materials were to occur, it could potentially be significant unless BMPs were implemented.				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
See response to VII (a) above.				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
VIII. HYDROLOGY AND WATER QUALITY— Would the project:				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
Increases in turbidity would be likely to occur during any in-stream construction work. Additionally, there is a potential for an increase of erosion and sedimentation from construction activity. This could be a significant impact and would require an erosion control plan, and the implementation of BMPs to reduce any impacts to waterways in and around the project area.				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).	☒	☐	☐	☐
There are serious concerns about the long-term draw-down of the groundwater table and land subsidence, particularly in dry years. Model development would help in determining the effects of increased groundwater pumping. The impact that groundwater withdrawal would have on existing groundwater supplies is as yet undetermined; however, it is potentially significant because of the complexity of the issue.				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐
Locations of recharge basins and/or additional conveyance facilities may have some affect on drainage patterns of naturally existing waterways. These facilities would be located in such a way as to minimize any impact to existing drainage of the project area.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☒	☐	☐
See response to VIII (c) above.				
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
IX. LAND USE AND PLANNING—Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐
Short-term impacts from increased noise and dust emissions could occur as a result of construction. Mitigation measures implemented for noise and air quality would reduce any impacts to a less than significant level.				
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
X. MINERAL RESOURCES—Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒
XI. NOISE—Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	☐	☒	☐	☐
Short-term noise levels are expected to increase for the duration of construction. These noise increases would be temporary, and mitigation measures would be implemented to reduce any impact to a less than significant level.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
XII. POPULATION AND HOUSING—Would the project:				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIII. PUBLIC SERVICES—Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?	☐	☐	☐	☒
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☒	☐
XIV. RECREATION—Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒
XV. TRANSPORTATION/TRAFFIC—Would the project:				
a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒
XVI. UTILITIES AND SERVICE SYSTEMS— Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐